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Review of space-based approaches

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The idea looking down the Earth to observe air-showers from space is not new. In fact, John Linsley already in 1979, has proposed to use a space telescope for the observation of UV emission from air-showers. Since then, a few missions are proposed to achieve this next generation technology for the exploration of the high energy universe. Space-based ultra-high energy observatories have important advantages compared with ground detectors: 1) the huge exposure area, 2) the well constrained distance to a shower, 3) the dust-free atmosphere in the above half troposphere, 4) the almost uniform exposure covering both hemispheres. Currently four space missions, dedicated to air-shower observation, have been proposed and planned by international collaborations of scientists and gencies, those are TUS (Tracking Ultra-violet Set up), JEM-EUSO (Extreme Universe Space Observatory on board Japanese Experiment Module), KLPVE, and Super-EUSO. In this presentation, I will review those missions and discuss a sound way to construct the solid basis of this new technology and possible collaborations between space and ground based facilities.

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